CLAIMS

WE CLAIM:

1. A horizontal magnetic head having an air bearing surface (ABS), comprising:

at least one coil layer and an insulation stack;

the coil layer being embedded in the insulation stack;

first and second pole pieces;

the insulation stack being sandwiched between the first and second pole pieces;

the first pole piece having a first horizontal component which is at least partially bounded by first and second thin film surfaces joined by a first edge, the first thin film surface of the first horizontal component forming a portion of the ABS;

the second pole piece having a second horizontal component which is at least partially bounded by first and second thin film surfaces joined by a second edge extending therebetween, the first thin film surface of the second horizontal component also forming a portion of the ABS;

a write gap layer sandwiched between said first and second edges;

a first shield layer having first and second thin film surfaces joined by a third edge, the first thin film surface of the first shield layer forming a portion of the ABS;

a second shield layer having first and second thin film surfaces joined by a fourth edge, the first thin film surface of the second shield layer forming a portion of the ABS;

a magnetoresistive (MR) sensor and first and second gap layers;

the MR sensor being sandwiched between the first and second gap layers and the first and second gap layers being sandwiched between the third and fourth edges; and

the MR sensor and the first and second gap layers forming a portion of the ABS.

2. A magnetic head as claimed in claim 1 comprising:

an insulation layer sandwiched between the MR sensor and the first pole piece.

3. A magnetic head as claimed in claim 1 comprising:

the first horizontal component and the second shield layer being a common layer.

4. A magnetic head as claimed in claim 1 comprising:

the MR sensor having an active region, the active region having a width which defines a read track width;

each of the first and second horizontal components having a width at said write gap layer which defines a write track width; and

the widths of the first and second horizontal components and the active region of the MR sensor being aligned along a magnetic medium track.

5. A magnetic head as claimed in claim 1 comprising:

the MR sensor including only one elongated MR stripe which has a longitudinal axis, the longitudinal axis extending perpendicular to a direction of media movement.

6. A magnetic head as claimed in claim 5 comprising:

the first pole piece having a first recessed horizontal component which is recessed from and extends parallel to the ABS;

the first pole piece having a slanted component which extends at an angle to the ABS and joins the first recessed component and the first horizontal component;

an insulation layer separating the MR sensor, the first and second gap layers and the first and second shield layers from the first recessed component.

7. A magnetic head as claimed in claim 6 comprising:

the MR sensor having an active region, the active region having a width which defines a read track width;

each of the first and second horizontal components having a width at said write gap layer which defines a write track width; and

the widths of the first and second horizontal components and the active region of the MR sensor being aligned along a magnetic medium track.

8. A magnetic head as claimed in claim 7 comprising:

the first horizontal component and the second shield layer being a common layer;

the second pole piece having a recessed horizontal component which is recessed from and extends parallel to the ABS; and

the second horizontal component being joined to the second recessed horizontal component.

9. A magnetic head as claimed in claim 1 comprising:

the MR sensor including first and second MR stripes which are spaced apart by a spacer layer;

each MR stripe having a longitudinal axis which extends perpendicular to a direction of media movement; and

the first and second MR stripes being sandwiched between the first and second gap layers.

10. A magnetic head as claimed in claim 9 comprising:

the first pole piece having a first recessed horizontal component which is recessed from and extends parallel to the ABS;

the first pole piece having a slanted component which extends at an angle to the ABS and joins the first recessed component and the first horizontal component;

an insulation layer separating the MR sensor, the first and second gap layers and the first and second shield layers from the first recessed component.

11. A magnetic head as claimed in claim 10 comprising:

the MR sensor having an active region, the active region having a width which defines a read track width;

each of the first and second horizontal components having a width at said write gap layer which defines a write track width; and

the widths of the first and second horizontal components and the active region of the MR sensor being aligned along a magnetic medium track.

12. A magnetic head as claimed in claim 11 comprising:

the first horizontal component and the second shield layer being a common layer;

the second pole piece having a recessed horizontal component which is recessed from and extends parallel to the ABS; and

the second horizontal component being joined to the second recessed horizontal component.

13. A magnetic disk drive comprising:

a horizontal magnetic head including:

at least one coil layer and an insulation stack;

the coil layer being embedded in the insulation stack;

first and second pole pieces;

the insulation stack being sandwiched between the first and second pole pieces;

the first pole piece having a first horizontal component which is partially bounded by first and second thin film surfaces joined by a first edge, the first thin film surface of the first horizontal component forming a portion of the ABS;

the second pole piece having a second horizontal component which is partially bounded by first and second thin film surfaces joined by a second edge

extending therebetween, the first thin film surface of the second horizontal component also forming a portion of the ABS;

a write gap layer sandwiched between said first and second edges;

a first shield layer having first and second thin film surfaces joined by a third edge, the first thin film surface of the first shield layer forming a portion of the ABS;

a second shield layer having first and second thin film surfaces joined by a fourth edge, the first thin film surface of the second shield layer forming a portion of the ABS;

a magnetoresistive (MR) sensor and first and second gap layers;

the MR sensor being sandwiched between the first and second gap layers and the first and second gap layers being sandwiched between the third and fourth edges; and

the MR sensor and the first and second gap layers forming a portion of the ABS;

a frame;

a magnetic disk rotatably supported on the frame;

a support mounted on the frame for supporting the head in a transducing relationship with the magnetic disk;

means for rotating the magnetic disk;

positioning means connected to the support for moving the head to multiple positions with respect to said magnetic disk; and

means connected to the head, to the means for rotating the magnetic disk and to the positioning means for exchanging signals with the head, for controlling movement of the magnetic disk and for controlling the position of the head.

14. A disk drive as claimed in claim 13 comprising:

the MR sensor including only one elongated MR stripe which has a longitudinal axis, the longitudinal axis extending perpendicular to a direction of media movement.

15. A disk drive as claimed in claim 14 comprising:

the first pole piece having a first recessed horizontal component which is recessed from and extends parallel to the ABS;

the first pole piece having a slanted component which extends at an angle to the ABS and joins the first recessed component and the first horizontal component;

an insulation layer separating the MR sensor, the first and second gap layers and the first and second shield layers from the first recessed component;

the MR sensor having an active region, the active region having a width which defines a read track width;

each of the first and second horizontal components having a width at said write gap layer which defines a write track width;

the widths of the first and second horizontal components and the active region of the MR sensor being aligned along a a magnetic medium track;

the first horizontal component and the second shield layer being a common layer;

the second pole piece having a recessed horizontal component which is recessed from and extends parallel to the ABS; and

the second horizontal component being joined to the second recessed horizontal component.

16. A disk drive as claimed in claim 13 comprising:

the MR sensor including first and second MR stripes which are spaced apart by a spacer layer;

each MR stripe having a longitudinal axis which extends perpendicular to a direction of media movement; and

the first and second MR stripes being sandwiched between the first and second gap layers.

17. A disk drive as claimed in claim 16 comprising:

the first pole piece having a first recessed horizontal component which is recessed from and extends parallel to the ABS;

the first pole piece having a slanted component which extends at an angle to the ABS and joins the first recessed component and the first horizontal component;

an insulation layer separating the MR sensor, the first and second gap layers and the first and second shield layers from the first recessed component;

the MR sensor having an active region, the active region having a width which defines a read track width;

each of the first and second horizontal components having a width at said write gap layer which defines a write track width;

the widths of the first and second horizontal components and the active region of the MR sensor being aligned along a a magnetic medium track;

the first horizontal component and the second shield layer being a common layer;

the second pole piece having a recessed horizontal component which is recessed from and extends parallel to the ABS; and

the second horizontal component being joined to the second recessed horizontal component.

18. A method of making a horizontal magnetic head having an air bearing surface (ABS), comprising:

forming at least one coil layer and an insulation stack with the coil layer being embedded in the insulation stack;

forming first and second pole pieces with the insulation stack sandwiched between the first and second pole pieces;

forming the first pole piece with a first horizontal component which is partially bounded by first and second thin film surfaces joined by a first edge with the first thin film surface of the first horizontal component forming a portion of the ABS;

forming the second pole piece with a second horizontal component which is partially bounded by first and second thin film surfaces joined by a second edge extending therebetween with the first thin film surface of the second horizontal component also forming a portion of the ABS;

forming a write gap layer between said first and second edges;

forming a first shield layer having first and second thin film surfaces joined by a third edge with the first thin film surface of the first shield layer forming a portion of the ABS;

forming a second shield layer having first and second thin film surfaces joined by a fourth edge with the first thin film surface of the second shield layer forming a portion of the ABS;

forming a magnetoresistive (MR) sensor and first and second gap layers with the MR element sandwiched between the first and second gap layers and the first and second gap layers being sandwiched between the third and fourth edges; and

forming the MR sensor so that the first and second gap layers form a portion of the ABS.

19. A method as claimed in claim 18 comprising:

forming an insulation layer between the MR sensor and the first pole piece.

20. A method as claimed in claim 18 comprising:

forming the first horizontal component and the second shield layer as a common layer.

21. A method as claimed in claim 18 comprising:

forming the MR sensor with an active region wherein the active region has a width which defines a read track width;

forming each of the first and second horizontal components with a width at said write gap layer which defines a write track width; and

aligning the widths of the active region and the first and second horizontal components along a magnetic medium track.

22. A method as claimed in claim 18 comprising:

forming the MR sensor with only one elongated MR stripe which has a longitudinal axis with the longitudinal axis extending perpendicular to a direction of magnetic media movement.

23. A method as claimed in claim 22 comprising:

forming the first pole piece with a first recessed horizontal component which is recessed from and extends parallel to the ABS;

forming the first pole piece with a slanted component which extends at an angle to the ABS and joins the first recessed component and the first horizontal component; and

forming an insulation layer which separates the MR sensor, the first and second gap layers and the first and second shield layers from the first recessed component.

24. A method as claimed in claim 23 comprising:

forming the MR sensor with an active region wherein the active region has a width which defines a read track width;

forming each of the first and second horizontal components with a width at said write gap layer which defines a write track width; and

aligning the widths of the active region and the first and second horizontal components along a magnetic medium track.

25. A method as claimed in claim 24 comprising:

forming the first horizontal component and the second shield layer as a common layer;

forming the second pole piece with a recessed horizontal component which is recessed from and extends parallel to the ABS; and

joining the second horizontal component to the second recessed horizontal component.

26. A method as claimed in claim 18 comprising:

forming the MR sensor with first and second MR stripes which are spaced apart by a spacer layer;

forming each MR stripe with a longitudinal axis which extends perpendicular to a direction of magnetic media movement; and

forming the first and second MR stripes between the first and second gap layers.

27. A method as claimed in claim 26 comprising:

forming the first pole piece with a first recessed horizontal component which is recessed from and extends parallel to the ABS;

forming the first pole piece with a slanted component which extends at an angle to the ABS and joins the first recessed component and the first horizontal component; and

forming an insulation layer which separates the MR sensor, the first and second gap layers and the first and second shield layers from the first recessed component.

28. A method as claimed in claim 27 comprising:

forming the MR sensor with an active region wherein the active region has a width which defines a read track width;

forming each of the first and second horizontal components with a width at said write gap layer which defines a write track width; and

aligning the widths of the active region and the first and second horizontal components along a magnetic medium track.

29. A method as claimed in claim 28 comprising:

forming the first horizontal component and the second shield layer as a common layer;

forming the second pole piece with a recessed horizontal component which is recessed from and extends parallel to the ABS; and

joining the second horizontal component to the second recessed horizontal component.